CLAIMS

1.   A method for generating a variance map from projection data acquired from a tomography system comprising:

accessing the projection data from the tomography system;

generating the variance map from the projection data; and

displaying, analyzing or processing the variance map.

2.   The method of claim 1, wherein the projection data comprises measured projection data or simulated projection data.

3.   The method of claim 1, further comprising generating the variance map from reconstructed image data.

4.   The method of claim 1, wherein generating the variance map comprises formulating a variance measure based upon the projection data using a statistical model.

5.   The method of claim 4, comprising determining variability of a mean pixel value caused by noise factors and artifact factors associated with the projection data based upon the variance measure.

6.   The method of claim 4, wherein the variance map is generated using a reconstruction algorithm.

7.   The method of claim 6, wherein the reconstruction algorithm is a weighted filtered backprojection reconstruction algorithm.

8.   The method of claim 6, wherein the reconstruction algorithm is adapted to operate on the variance measure to generate the variance map.

9.   The method of claim 1, wherein the projection data is reconstructed to generate original image data and wherein the original image data is displayed or analyzed based upon or in conjunction with the variance map.

10.   The method of claim 9, further comprising identifying features of interest in the original image data based upon the variance map.

11.   The method of claim 1, further comprising altering acquisition system settings and reacquiring projection data based upon the variance map.

12.   A method for generating a variance map from measured projection data acquired from a tomography system comprising:

    accessing the measured projection data from the tomography system;

    formulating a variance measure based upon the measured projection data; and

    generating the variance map from the variance measure using a reconstruction algorithm.

13.   The method of claim 12, comprising determining variability of a mean pixel value caused by noise factors and artifact factors associated with the measured projection data based upon the variance measure.

14.   The method of claim 12, wherein formulating a variance measure is based on a statistical model.

15.   The method of claim 12, wherein the reconstruction algorithm is a weighted filtered backprojection reconstruction algorithm.

16.   The method of claim 12, wherein the reconstruction algorithm is a fast reconstruction algorithm such as a Fourier-based algorithm, a hierarchical algorithm, or a coarse reconstruction based on downsampled projection data and/or image data.

17. The method of claim 15, wherein the reconstruction algorithm is adapted to operate on the variance measure to generate the variance map.

18. The method of claim 12 further comprises displaying, analyzing or processing the variance map.

19. The method of claim 12, wherein the measured projection data is reconstructed to generate original image data and wherein the original image data is displayed or analyzed based upon or in conjunction with the variance map.

20. The method of claim 12, further comprising identifying features of interest in the original image data based upon the variance map.

21. A method for generating a variance map from measured projection data acquired from a tomography system comprising:

accessing the measured projection data from the tomography system;

formulating a variance measure based upon the measured projection data;

generating the variance map based upon the variance measure using a reconstruction algorithm; and

displaying analyzing or processing the variance map.

22. The method of claim 21, comprising determining variability of a mean pixel value caused by noise factors and artifact factors associated with the measured projection data based upon the variance measure.

23. The method of claim 21, wherein formulating a variance is based upon a statistical model.

24. The method of claim 21, wherein the reconstruction algorithm is a weighted filtered backprojection reconstruction algorithm.

25. The method of claim 24, wherein the reconstruction algorithm is adapted to operate on the variance measure to generate the variance map.

26. The method of claim 21, wherein the measured projection data is reconstructed to generate original image data and wherein the original image data is displayed analyzed or processed based upon the variance map.

27. The method of claim 21, further comprising identifying features of interest in the original image data based upon the variance map.

28. A tomography system for generating a variance map from measured projection data comprising:

an X-ray source configured to project a plurality of X-ray beams through an object;

a detector configured to produce a plurality of electrical signals in response to received X-ray beams from the source; and

a processor configured to process the plurality of electrical signals to generate measured projection data, wherein the processor is further configured to access the measured projection data from the tomography system; to formulate a variance measure based upon the measured projection data; to generate a variance map based upon the variance measure using a reconstruction algorithm; and to display, analyze or process the variance map.

29. At least one computer-readable medium storing computer instructions for instructing a computer system for generating a variance map from projection data acquired from a tomography system, the computer instructions comprising:

accessing the projection data from the tomography system;

generating a variance map from the projection data; and

displaying analyzing or processing the variance map.

30.   A tomography system for generating a variance map from measured projection data comprising:

means for accessing the measured projection data from the tomography system;

means for formulating a variance measure based upon the measured projection data;

means for generating the variance map based upon the variance measure using a reconstruction algorithm; and

means for displaying analyzing or processing the variance map

31.   A method for generating a variance map from measured projection data acquired from a tomography system comprising:

formulating a variance measure based upon the measured projection data;

generating the variance map from the variance measure using a reconstruction algorithm; and

processing image data derived from the measured projection data based upon or in conjunction with the variance map.

32.   The method of claim 31, wherein formulating a variance measure is based on a statistical model.

33.   The method of claim 31, wherein the step of processing includes performing pixel interpolation based upon the variance map.

34.   The method of claim 31, wherein the step of processing includes filtering of image data to enhance display of a reconstructed image based upon the variance map.

35.   The method of claim 31, wherein the step of processing includes determining confidence measures for edge detection based upon the variance map.

36.   The method of claim 31, wherein the step of processing includes determining confidence measures for object segmentation or object sizing based upon the variance map.

37.   The method of claim 31, wherein the step of processing includes modulating a gradient-based deformable model for image segmentation based upon the variance map.

38.   The method of claim 31, wherein the step of processing includes material classification or model data fitting based upon the variance map.

39.   The method of claim 31, wherein the step of processing includes preparing a multi-dimensional image display or image visualization based upon the variance map.

40.   The method of claim 31, wherein the step of processing includes determining an image acquisition scheme based upon the variance map.